

CLAIMS

1. A superconducting magnet system comprising:
 - (A) a superconducting magnet and a cryogenic shield for providing cooling to the superconducting magnet;
 - (B) a cryocooler positioned to provide refrigeration to the cryogenic shield;
 - (C) a cryogen vessel containing liquid cryogen; and
 - (D) a heat pipe extending from the cryogen vessel to the cryogenic shield.
2. The superconducting magnet system of claim 1 wherein the superconducting magnet is immersed in liquid helium.
3. The superconducting magnet system of claim 1 wherein the cryogenic shield comprises a plurality of layers, including an innermost layer closest to the superconducting magnet and an outermost layer furthest from the superconducting magnet.
4. The superconducting magnet system of claim 3 wherein the cryogenic shield comprises three layers.
5. The superconducting magnet system of claim 3 wherein the cryocooler is positioned to provide cooling to each of the layers of the cryogenic shield.

6. The superconducting magnet system of claim 3 wherein the heat pipe extends to the outermost layer of the cryogenic shield.

7. The superconducting magnet system of claim 1 further comprising means for providing refrigeration from the cryocooler to the cryogen vessel.

8. The superconducting magnet system of claim 7 wherein the means for providing refrigeration from the cryocooler to the cryogen vessel comprises a bus bar.

9. The superconducting magnet system of claim 1 wherein the heat pipe is in fluid communication with the cryogen vessel.

10. The superconducting magnet system of claim 1 wherein the heat pipe includes an upper heat exchange surface which is in direct heat exchange relation with the cryogen vessel.